

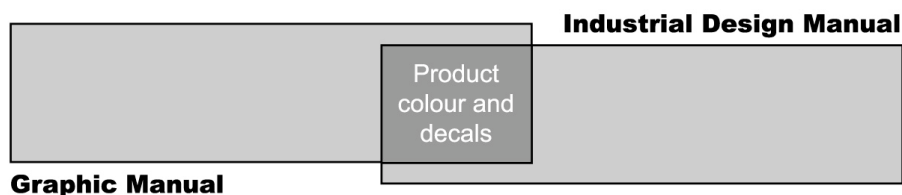
## EXPLORING INDUSTRIAL DESIGN MANUALS IN THE FINNISH ENGINEERING INDUSTRY

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### 1. Introduction

The graphic and brand manuals set up by communications or advertising agencies are perhaps the most common examples of creating design guidelines for specific tasks. These manuals are the result of a design process aiming towards quite rigid production plans of certain 2-D elements and materials that are already formed as standards, such as stationery, brochures and web pages. The graphic manuals possibly come closest to industrial design manuals if they define e.g. colours or decals of a product. This is also the area where industrial design (ID) contacts the product development process in the most superficial fashion, at the level of surface finishing.



**Figure 1. The overlapping of graphic and ID manuals**

Product engineering design manuals that are based on a similar logic as graphic manuals contain all standardised technical components of one product or production line. Continuing the same concept concerning an industrial design manual, it would contain the collection of product components designed by industrial designers that are most critical to the appearance of the product. For example, in the papermaking line industry, such components can be walkways and rails, door frames, safety fences and instrumentation. This kind of approach seems to be the most common idea behind industrial design manuals. The question is how well these kinds of manuals assist in managing and guiding industrial design work.

In Finnish business-to-business engineering industries, managing the industrial design function has emerged as an essential question alongside the increased demand to utilise industrial design better as a competitive means. Often this demand is in disproportion to the capacity available. The fact that companies usually have limited internal industrial design resources means that 1) in most cases practising industrial design work is extensively externally contracted; 2) the project managers are often single-handedly responsible for utilising industrial design; and 3) industrial design work is rarely documented or explicitly evaluated. Due to these factors, managing and applying industrial design work depends largely on the competence, knowledge and bias of the project managers, who usually co-ordinate industrial design alongside their other tasks.

The industrial design manuals and guidelines have been seen as one solution to this dilemma as a practical tool for the project managers. The manual, however, is not an easy nor quick road to better industrial design utilisation, because, as with all improvements, industrial design work needs to be built on a solid foundation, which may take several years to generate. Some kind of documentation is especially required to build the organisational capability, so that processes can be practised as they are documented [Paulk et al 1993]. Lack of a sufficient amount of documentation, coherent data, and changing project managers produce a challenging task for anyone trying to evaluate the contribution and outcomes of industrial design work.

This paper introduces a four-level maturity grid of industrial design manuals. The grid provides information both on the current status of actions, as well a source of direction for future activities. The grid is generic and cannot be applied directly, since the companies, their strategies and processes vary.

## **2. Method**

This paper is part of a research project called Proactive Design (PROOMU), funded by the Finnish Technology Agency (Tekes). The project started in 2002 and is a collaboration between the University of Art and Design and the University of Helsinki. The duration of the project is three years. The paper is based on documentary analyses and ethnographic studies conducted in four global Finnish engineering corporations operating in the business-to-business area. These companies produce papermaking lines, mineral and rock processing equipment, elevators and escalators, wood processing equipment and steel products such as steel constructions, roofing and facade materials. The material consists of interviews with both internal and external industrial designers and other relevant employees situated at different levels of the organisations. The data also includes field notes as well as audio and video recordings of the creating and updating processes of industrial design manuals and guidelines in the participating companies.

## **3. The maturity grid of ID manuals in the Finnish engineering industry**

The key activities which elaborate the grid are 1) ID knowledge documentation, 2) ID knowledge flow, 3) ID manual content and purpose, 4) ID manual implementation, 5) Content creation, evaluation and testing, 6) ID manual target groups. The grid outlines the characteristic features of each key activity in four maturity levels. In this way it provides information both on the current status of actions, as well a source of direction for future activities [Crosby 1979]. Although the grid forms an evolutionary process, it is also a continuous representation in which various key activities may be located at different maturity levels.

In the following sections the characteristic features of key activities on different maturity levels are described. In addition, some factors that also seem to affect the content and form of the industrial design manual, such as 1) the position of the industrial design function in relation to the current product development processes and 2) the number and position of industrial designers (whether they are internal or external, and on what organisational level they operate) are discussed

### **3.1 Level 1**

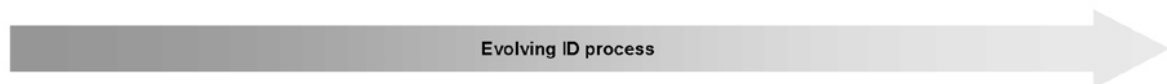
Industrial design is typically an irregular function on the side of product development processes in companies situated at level 1. The management and co-ordination of industrial design work is practised along with primary tasks by actors in charge of individual product development processes. No or few internal designers exist and they may work in completely other areas than product development, like e.g. marketing within the organisation. Operative industrial design work is practised rarely and it is externally contracted from industrial design consultants, which, in the worst cases, change frequently. At this level industrial design is utilised mainly quite superficially, by specifying surface materials, forms, colours, etc.

A physical manual does not exist at this level, but instead occasional documentation appears in the form of off-line images. The industrial design information is mainly in the form of tacit knowledge

and it is scattered in and outside of the organisation. Industrial design knowledge is used only within product development teams. It travels from one development team to another by single actors in an informal manner. No actor is responsible for gathering the industrial design information, and the collecting of the data is accidental.

**Table 1. Maturity grid of ID manual**

Key Activities	Level 1	Level 2	Level 3	Level 4
ID knowledge documentation	Knowledge is scattered about Occasional documentation	Knowledge gathered in one document	Titled document has planned structure	Documentation targeted to the different actors of organisation
ID knowledge flow	"At the coffee break"	Few owners, information shared by request	Active diffusion of knowledge	Recognition in all levels of organisation
ID manual content and purpose	Tacit knowledge Off-line images	Scrapbook of the ID implementations Aids to targeting the ID function Design "hints"	Sample folder of ID function Defines the tasks and key criteria of ID Standardise product lines	ID guidelines in product development process model Adjusting tool Anticipatory information as a material of innovations
Content creation and implementation	No one responsible.	Single actor responsibility	Team of relevant actors	Cross functional team of experts and external evaluators
Evaluation and adjusting	Casual collecting of data	Regular collecting Occasional remarks cause no action.	Irregular updating Evaluations rarely lead to action	Regular audits and updates
ID manual target groups	Product development teams	Product development unit	The business level	The corporate level



### 3.2 Level 2

At the second level of the maturity grid, industrial design is considered having a minor function as part of the product development process. These companies have a few internal industrial designers who often have the role of co-ordinating externally contracted industrial design work, as well as assisting project managers concerning the industrial design related issues. The function and processes for industrial design is not yet established, and therefore it is not fully utilised in all of the new product development projects.

At this level the manual has a scrapbook-like appearance and it provides industrial design advice. It contains examples of past product development projects that have implemented industrial design. This type of material aids in developing the application of the industrial design function further, and it is possible to produce even with small industrial design resources. Material is collected regularly by a single responsible actor, but the structure of the manual is still quite inconsistent. There are no regular updating processes and the occasionally presented suggestions do not necessarily cause any actions to develop the structure or content of the document. The manual is mainly targeted to the personnel in the product development unit and the information is usually shared by request only.

### 3.3 Level 3

At level three industrial design is a solid part of the product development processes. An appropriately sized internal industrial design organisation with actors performing also above the operative level exists. External industrial design work is led by an internal design manager among project managers. The industrial design function has an established position, process and a formulated role.

The industrial design manual has a title, planned structure and content. It describes the activities of the industrial design function, defines tasks, and at best, outlines the key criteria of industrial design work. This type of manual aims to standardise product lines. A team of relevant actors are liable for industrial design manual generation and the content is diffused actively beyond the operative levels. However, irregular evaluations lead only rarely to actions of updating.

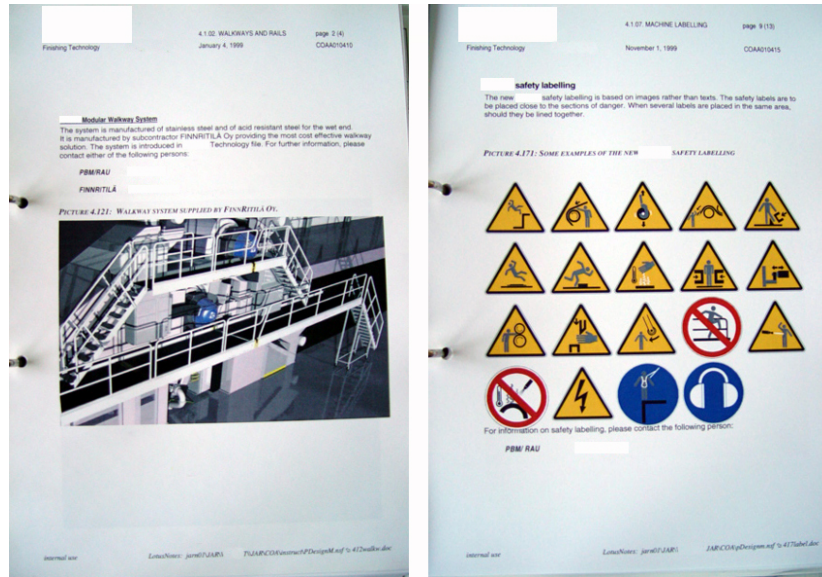


Figure 2. Example of standardised objects from ID manual (walkways and safety labels)

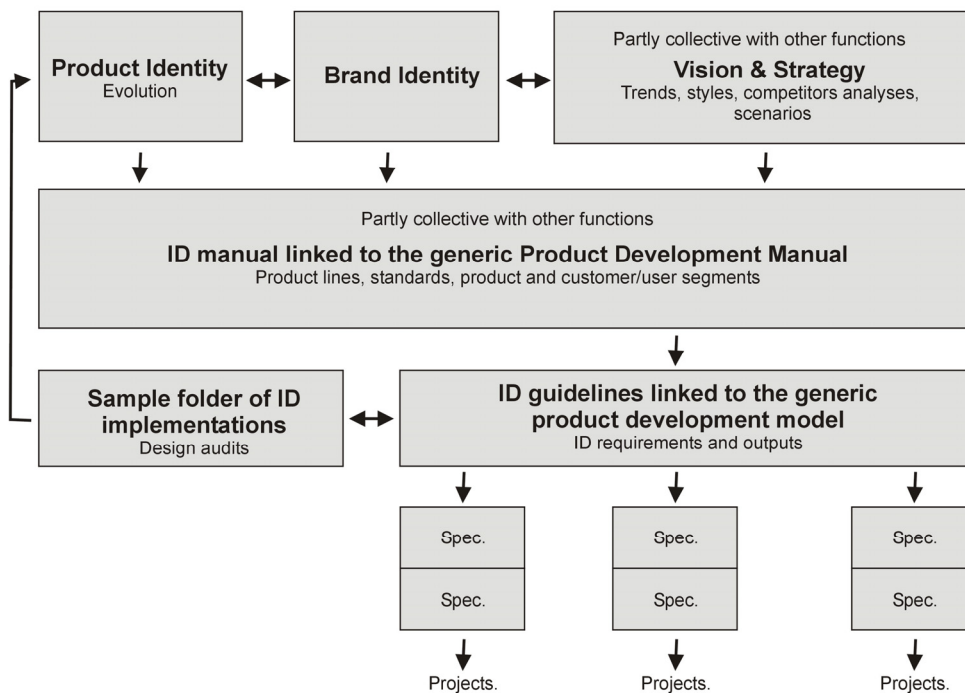


Figure 3. The hierarchy of ID manual components in level 4 (draft)

### 3.4 Level 4

In level 4 the industrial design function has a holistic impact on the company. Industrial design experts operate in all levels of the organisation, and the tasks between inner and external industrial design functions are explicitly defined. The industrial design manual contains specific material for different groups of actors and industrial design is recognised throughout the organisation up to the corporate level. The manual provides industrial design guidelines linked to the general product development process models, and it contains anticipatory information as a resource for concept creation, innovation and strategy. With regular audits a cross-functional team of experts and external evaluators plan and support the constant development of the industrial design manual.

## 4. Conclusions

According to our research data companies on level 1 are usually the most interested in developing manuals in order to utilise industrial design more effectively. Companies at levels 1 or 2 of the maturity grid may set ambitious goals to create guidelines such as described at level 4. This is a challenge, because in these companies 1) industrial design work is applied irregularly, 2) internal industrial design resources are limited, 3) industrial design work done by external consultants needs to be harmonised and managed and 4) industrial design is being documented in an incomplete manner. The industrial design manuals or guidelines are sometimes seen as quick solutions to support better and more efficient industrial design utilisation. This idea is illusory because the manuals need to be built on a solid foundation of industrial design work, which might not exist if the companies possess only very thin industrial design competencies. A leap across several levels is challenging, because it is the documented knowledge accumulated by systematic industrial design work that provides the content for the creation of the manual. A systematically collected industrial design manual constructs an insight of the past, contributes to daily activities, and aids to uncover directions for future developments.

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